THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 34

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YORIHISA YAMAMOTO,
YUTAKA NISHI, TAKASHI NISHIMORI,
and HIROYUKI TOKUNAGA

Appeal No. 96-4156
Application 08/218,135[1]

HEARD: July 13, 1999

Before HAIRSTON, BARRETT, and FRAHM, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

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[1] Application for patent filed March 25, 1994, entitled "Vehicle Steering System," which claims the foreign filing priority benefit under 35 U.S.C. § 119 of Japanese Application 5-186948, filed June 29, 1993.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's refusal to allow claims 1-4. The amendment (Paper No. 23) filed April 26, 1997, in response to the Examiner's indication of allowable subject matter in the Examiner's Answer has been entered (Paper No. 30). Amended claims 5-11 are indicated to be allowable.

We reverse.

BACKGROUND

In the Background of the Invention, Appellants describe that in vehicles having power steering systems with steering torque assisted by an output torque of an electric motor (specification, page 2, lines 13-28):

> [I]t has been proposed to detect an irregular behavior of the vehicle caused by an external disturbance from the yaw rate or lateral acceleration of the vehicle, and to produce a reaction with an electric motor for producing a steering torque which cancels the effect of such a disturbance so that the irregular behavior of the vehicle due to external disturbances may be controlled.
>
> However, according to such a control system using an electric motor, for instance, if the lateral acceleration sensor, the yaw rate sensor or the reaction control device should fail, there would be no steering torque as it is normal to stop the electric motor in such a situation, and this would not only cause discomfort to the vehicle operator but also impair the convenience of the steering system.

This appears to be an admission of prior art (see Br3-4). The specification discloses (page 4, lines 5-11): "Normally, said failure detecting means is adapted to additionally detect a failure of another part of said vehicle steering system, and preferably stops an overall control of said vehicle steering system . . . ." Appellants' invention is to prohibit the reaction control means from producing commands to produce the steering wheel reaction to the electric motor when a failure of the reaction control means is sensed, instead of stopping the electric motor.

Claim 1 is reproduced below.

> 1. A vehicle steering system, comprising:
>
> power means for applying a steering torque to steerable wheels of a vehicle;
>
> power assist control means for detecting a steering torque input produced by a steering effort made by a vehicle operator, and producing a command to said power means to produce an assisting steering torque according to detected steering torque input;
>
> reaction control means for producing a command to said power means to produce a steering wheel reaction in response to a turning maneuver of said vehicle;
>
> failure detecting means for detecting a failure of said reaction control means; and
>
> means for prohibiting said reaction control means from producing said command to said power means to

produce said steering wheel reaction when said failure detecting means has detected a failure in said reaction control means.

The Examiner relies on the following prior art:[2]

O'Neil	4,860,844	August 29, 1989
Yamamoto	5,010,970	April 30, 1991
Nishihara et al. (Nishihara)	5,029,466	July 9, 1991

Claims 1 and 2 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamamoto and O'Neil. This is a new ground of rejection entered in the Examiner's Answer.

Claims 3 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamamoto, O'Neil, and Nishihara. This is a new ground of rejection entered in the Examiner's Answer.

We refer to the Examiner's Answer (Paper No. 20) (pages referred to as "EA__") and the Response to Reply Brief (Paper No. 26) for a statement of the Examiner's position and to the Reply Brief (Paper No. 24) (pages referred to as "RBr__") for

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[2] The Examiner's Answer erroneously lists Ito et al., U.S. Patent 4,830,127, Hirose, U.S. Patent 5,014,801, Hattori et al., U.S. Patent 5,135,069, Nishimoto et al., U.S. Patent 5,360,977, as prior art relied on in the rejection of the claims on appeal (Examiner's Answer, page 2, Sec. (7)). However, the rejections over these references have been withdrawn in favor of a new ground of rejection (Examiner's Answer, page 7).

Appellants' arguments thereagainst. Since the Examiner entered all new grounds of rejection over different prior art in the Examiner's Answer, the Final Rejection (Paper No. 10) is moot. The Brief (Paper No. 19) (pages referred to as "Br__") is still relevant for its Summary of the Invention (Br2-6).

OPINION

The Examiner does not rely on the admission of prior art in the specification, but applies Yamamoto and O'Neil. Yamamoto discloses a power steering system having an electric motor for assisting in rotating the steering shaft when the sensed steering torque is too great (abstract). Yamamoto does not have a "reaction control means" or "failure detecting means," which are admitted by Appellants to have been known in the art (specification, page 2, lines 13-28; Br3-4). Thus, the Examiner has not started the rejection in the best possible position.

O'Neil discloses a "steer-by-wire" system for large vehicles whose steered wheels are turned by hydraulic actuators. The system is essentially a torque demand control where torque at the steered wheels is a more powerful copy of

the torque applied to the steering wheel by the operator. The primary steering system, which is used under normal, no-fault conditions, has two main feedback loops, i.e., an inner loop and an outer loop. The inner loop forms a position controller in which the position of the steered wheels SDW is repeated by angularly positioning the repeater shaft RS, which is connected to a torsional spring TLS. The outer loop forms a torque demand steering controller which uses a torque sensor TQS attached to the steering wheel SGW through steering shaft SS to control a multiplied torque for the steered wheels SDW. In the event of loss of electrical power, the primary torque demand steering system automatically defaults to an open-loop secondary steering system. In secondary system operation, the motor DCM serves as a generator to control the servo valve SV to manage the hydraulic flow to the piston HP to control the steered wheels SDW.

The Examiner finds (EA4): "O'Neil, on the other hand, discloses a power steering system comprising means for coupling a reaction torque from a mechanical position means to the steering wheel so as to oppose torque applied by a driver to [the] steering wheel when an error or failure in the

mechanical means is detected. Column 10." As correctly noted by Appellants, this statement is in error "because the discussion at column 10 of the O'Neil Patent (claim 1) which the Examiner refers to corresponds to operation of the outer loop of O'Neil's primary steering system when there has been no failure, as more fully discussed at column 6, line 41-column 9, line 11 of the O'Neil Patent" (RBr8). We agree with Appellants that the references fail to disclose or suggest a failure detecting means or a means for prohibiting the reaction control means from producing a command to a power means when the failure detecting means has detected a failure. We further agree with Appellants that there is no suggestion to modify Yamamoto's system to include a secondary, failure-mode steering system such as taught by O'Neil. There are so many differences between Yamamoto and O'Neil that it is difficult to tell why one skilled in the power assisted steering art would have been led to modify Yamamoto in view of O'Neil except by using hindsight.

For the reasons discussed above, the Examiner has failed to establish a prima facie case of obviousness. The rejection of claims 1 and 2 is reversed. Nishihara does not cure the deficiencies of the combination of Yamamoto and O'Neil. Thus, the rejection of dependent claims 3 and 4 is also reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)
LEE E. BARRETT Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ERIC FRAHM Administrative Patent Judge	)

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